

DERWENT-ACC-NO: 1978-11810A
DERWENT-WEEK: 197806
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TITLE: Liquefied ammonia purificn. with increased efficiency - by
countercurrent crystallisation of condensed ammonia to remove carbon di:oxide,
water, oil and hydrocarbons

INVENTOR: DEUYATYKH, G G; ZELYAEV, I A ; ZORIN, A D

PATENT-ASSIGNEE: AS USSR CHEM INST[ASCHR]

PRIORITY-DATA: 1975SU-2157909 (July 18, 1975)

PATENT-FAMILY:

| PUB-NO | PUB-DATE | LANGUAGE | PAGES | MAIN-IPC |
|-------------|--------------|----------|-------|----------|
| SU 554207 A | July 4, 1977 | N/A | 000 | N/A |

INT-CL (IPC): C01C001/12

ABSTRACTED-PUB-NO: SU 554207A

BASIC-ABSTRACT: Ammonia is condensed, then subjected to countercurrent
crystallisation at -100 to -120 degrees C and 40-50 mm. pressure.

Method gives high degree of purificn. removing impurities which are difficult
to separate, such as oil, water, CO₂, methane, ethane and benzene to 10×10^{-3}
- $1 \times 10^{-5}\%$. Process is an improvement on the previous method in which oil and
mechanical impurities were removed by passing through activated coke, and
water, CO₂ and methane were removed by treatment with alkali metals.

TITLE-TERMS:

LIQUEFY AMMONIA PURIFICATION INCREASE EFFICIENCY COUNTERCURRENT
CRYSTAL
CONDENSATION AMMONIA REMOVE CARBON DI OXIDE WATER OIL

DERWENT-CLASS: E35

CPI-CODES: E32-A;

CHEMICAL-CODES:

Chemical Indexing M3 *01*

Fragmentation Code

C800 C730 C500 N160 M720 R023 R024 M411 M902

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L4 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2001:432982 CAPLUS

DOCUMENT NUMBER: 135:28441

TITLE: Method for measuring water concentration in ammonia

INVENTOR(S): Itou, Taizou; Hayashida, Hideki; Kosuge, Yasuhiro; Ishigaki, Fumiyasu

PATENT ASSIGNEE(S): Showa Denko Kabushiki Kaisha, Japan

SOURCE: Eur. Pat. Appl., 13 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|-----------------|------------|
| EP 1106990 | A2 | 20010613 | EP 2000-126959 | 20001208 |
| JP 2001228085 | A2 | 20010824 | JP 2000-346044 | 20001114 |
| PRIORITY APPLN. INFO.: | | | JP 1999-351585 | A 19991210 |
| | | | JP 2000-346044 | A 20001114 |

AB Method and app. for measuring a water concn. In ammonia, comprising using ammonia having a water concn. of 10 ppm or less as a ref. gas, introducing the ammonia at a const. flow rate into a multi-reflection long optical path gas cell, and measuring IR absorption intensity of water at at least one measurement wave no. in the range of from 3,500 to 4,000 cm⁻¹, from 2,600 to 3,100 cm⁻¹, or from 1,900 to 2,400 cm⁻¹ at which IR absorptions of ammonia and water do not overlap. According to the present invention, anal. of water in a low concn. range of 10 ppm or less in ammonia gas and liquefied ammonia can be performed in a simple and convenient manner. The method is suitable for detn. of concn. of trace water contained in high-purity ammonia used as a raw material in the prodn. of a semiconductor, for example, a GaN-type compd. semiconductor. The method is also suitable for producing ammonia having a decreased water content.

=> s (trace (3A) water) and ammon?

L5 543 (TRACE (3A) WATER) AND AMMON?

=> s l5 and ((concentrat? or amount) (3A) water)

L6 57 L5 AND ((CONCENTRAT? OR AMOUNT) (3A) WATER)

=> s l6 and (infra-red or IR)

L7 4 L6 AND (INFRA-RED OR IR)

=> d l7 ibib abs 1-4

L7 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1982:60171 CAPLUS

DOCUMENT NUMBER: 96:60171

TITLE: Isotopically decoupled vibrational spectra and proton exchange rates for crystalline ammonia and ammonia hydrate
AUTHOR(S): Thornton, Cynthia; Khatkale, M. S.; Devlin, J. Paul
CORPOR. SOURCE: Dep. Chem., Oklahoma State Univ., Stillwater, OK, 74078, USA
SOURCE: J. Chem. Phys. (1981), 75(12), 5609-14

CODEN: JCPSA6; ISSN: 0021-9606

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Codeposits of NH₃ with ND₃ or D₂O were prepd. at liq. N temps. in the absence of proton exchange. Vibrational data for the anhyd. cubic cryst. NH₃ contg. isolated NH₃ or ND₃, confirm that, relative to water ice, intermol. coupling in NH₃ ice exerts a relatively minor influence on the IR and Raman spectra. Nevertheless, sizeable decoupling shifts, particularly for .nu. 1, were obsd. and attributed to a combination of factors including correlation field and Fermi resonance effects. The Raman polarization data has also affirmed long standing assignments of .nu. 1 and .nu. 3 for NH₃ ice. Warming of the NH₃ thin films resulted in limited isotopic scrambling at 130 K, apparently possible only through the agency of trace concns. of water. The vibrational coupling pattern for the resultant NHD₂ and NH₂D mols. suggest that proton (deuteron) migration away from the exchange centers is impossible at temps. up to 150 K. By contrast, isotopic scrambling was rapid and complete at 140 K for amorphous NH₃ hydrate films (.apprx. 35% NH₃, .apprx. 65% D₂O) which were also prepd. without exchange at .apprx. 90 K. The proton (deuteron) exchange rate is much greater for the amorphous NH₃ hydrate at 140 K than for pure water ice. Such exchange requires both ion-pair defect formation and proton mobility. Since the NH₃ suppresses the H₃O⁺ concn. via formation of NH₄⁺, a suppression the likes of which stops proton exchange in water ice, the evidence strongly suggests that NH₄⁺ in NH₃ like H₃O⁺ in water, is an effective proton transfer agent, probably acting through a tunneling mechanism (i.e.; H₃N⁺-H.cntdot.cntdot.cntdot.NH₃.fwdarw.H₃N.cntdot.cntdot.cntdot.H-N+H₃ etc.) to render the proton mobile in the NH₃ hydrate. This mobility combined with the greater NH₄⁺ concn., relative to the H₃O⁺ concn. in H₂O ice Ic, results in isotopic scrambling at the reduced temp.

L1 25 S (WATER (3W) VAPOR) (10A) (AMMON? (3W) GAS)

L2 5 S L1 AND (IR OR INFRA-RED)

L2 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2001:319472 CAPLUS

DOCUMENT NUMBER: 134:328607

TITLE: Plasma-catalytic production of ammonia by gas discharge

INVENTOR(S): Gieshoff, Jurgen; Lang, Jurgen

PATENT ASSIGNEE(S): DMC2 Degussa Metals Catalysts Cerdec A.-G., Germany

SOURCE: Eur. Pat. Appl., 8 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: German

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
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| EP 1095907 | A2 | 20010502 | EP 2000-119056 | 20000902 |
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| EP 1095907 | A3 | 20020327 | | |
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| DE 19951976 | A1 | 20010510 | DE 1999-19951976 | 19991028 |
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| JP 2001151507 | A2 | 20010605 | JP 2000-325435 | 20001025 |
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PRIORITY APPLN. INFO.: DE 1999-19951976 A 19991028

AB NH₃ is manufd. by a plasma-catalytic process, whereby a N₂ and water vapor-contg. gas flow is fed through an elec. discharge, whose discharge tube is arranged with a catalyst, which contains a metal selected from Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Mn, and Cu on a catalyst support. As gas discharge is suitable a dielec. hindered discharge with a frequency of 50 Hz-1 MHz, microwave-discharge, corona discharge, or mixed discharges. The gas flow contains water vapor and N₂ in a molar ratio of (100:1)-(10:1). The catalyst support consists of titania, alumina, silica, cerium oxide, zirconia, zeolite, or mixts. and mixed oxides with a sp. surface >5 m²/g. The catalyst and the catalyst support is presented as shaped body, whereby the catalytic active components are placed in the surface. The catalyst is deposited as cover coating on the shaped bodies like dielec. ceramic, or glass, optionally org. polymers with an insulation resistance of >10⁶.OMEGA.*cm.

L2 ANSWER 2 OF 5 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2000:906521 CAPLUS

DOCUMENT NUMBER: 134:135248

TITLE: Scratch-resistant improvement of sol-gel derived nano-porous silica films

AUTHOR(S): Wang, Jue; Wu, Guangming; Shen, Jun; Yang, Tianhe; Zhang, Qinyuan; Zhou, Bin; Deng, Zhongsheng; Fan, Bin; Zhou, Dongping; Zhang, Fengshan

CORPORATE SOURCE: Pohl Institute of Solid State Physics, Tongji

University, Shanghai, 200092, Peop. Rep. China

SOURCE: Journal of Sol-Gel Science and Technology (2000), 18(3), 219-224

CODEN: JSGTEC; ISSN: 0928-0707

PUBLISHER: Kluwer Academic Publishers

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Scratch-resistance of sol-gel derived nanoporous silica films were studied. The thin films were prepd. with a dip-coating method from both one-step and two-step catalyzed silica sols, and treated in a mixt. gas of ammonia and water vapor afterwards. The thin films were characterized by using At. Force Microscope (AFM), ellipsometer, Fourier-transform IR Spectroscopy (FTIR). Exptl. results have shown that the two-step catalysis remarkably improves strength of the films, and abrasion-resistance and adhesion of the silica films were further increased after the mixt. gas treatment. It is attributed to the

crosslinking of silica particles in the sols by randomly branched or/and
entangled linear chains and more Si-O-Si bonds formed by the mixt. gas treatment.
REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE

L2 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 2000:619885 CAPLUS

DOCUMENT NUMBER: 133:353762

TITLE: Properties of sol-gel derived scratch-resistant nano-porous silica films by a
mixed atmosphere treatment

AUTHOR(S): Wu, G.; Wang, J.; Shen, J.; Yang, T.; Zhang, Q.; Zhou, B.; Deng, Z.; Bin,
F.; Zhou, D.; Zhang, F.

CORPORATE SOURCE: Pohl Institute of Solid State Physics, Tongji
University, Shanghai, 200092, Peop. Rep. China

SOURCE: Journal of Non-Crystalline Solids (2000), 275(3), 169-174

CODEN: JNCSBJ; ISSN: 0022-3093

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A strengthening mechanism for sol-gel derived nanoporous silica films was
studied. The silica films were prep'd. with the dip method from two-step
catalyzed silica sols and treated in a mixed atm. of ammonia and water
vapor afterwards. Properties of the films were analyzed by using at.
force microscopy (AFM), Fourier-transform IR spectroscopy
(FTIR), ellipsometry and an abrasion test, resp. The exptl. results have
shown that the two-step catalysis strengthens the films and the scratch
resistance of the silica films is further improved after treatment in the
mixed gas. The increase in strength is attributed to the crosslinking of
silica particles by randomly branched or/and entangled linear chains in
the sols, more Si-O-Si bonds formed by the mixed gas treatment and
structural changes in the silica films.

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE

L2 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1999:591417 CAPLUS

DOCUMENT NUMBER: 131:222691

TITLE: Absorption spectrometry of trace moisture in ammonia gas with a 1371 nm
distributed-feedback diode laser

AUTHOR(S): Wu, Shang-Qian; Masusaki, Hiroshi; Kimishima, Tetsuya; Kuze, Hiroaki;
Takeuchi, Nobuo

CORPORATE SOURCE: Tsukuba Laboratories, Nippon Sanso Corporation,
Tsukuba, 300-2611, Japan

SOURCE: Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes &
Review Papers (1999), 38(8), 4788-4793

CODEN: JAPNDE; ISSN: 0021-4922

PUBLISHER: Japanese Journal of Applied Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors report on the sensitivity improvement of in the quant. measurement of trace moisture in ammonia gas. A 1371 nm InGaAsP distributed-feedback diode laser operating at room temp. was used as the light source. A dual-cell optical configuration was employed in the scheme of tunable diode laser absorption spectrometry. Using signal and ref. cells, both 92 cm in length, the interfering effects of absorption lines of the major constituent gas (ammonia) were canceled in a remarkable manner. Other common mode noises including the etalon fringes associated with the wavelength scan were also reduced. The system is capable of detecting trace moisture content of 12 ppb. This is an improvement of more than two orders of magnitude compared with the conventional method of single-cell detection.

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES

L2 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2002 ACS

ACCESSION NUMBER: 1996:259750 CAPLUS

DOCUMENT NUMBER: 124:306033

TITLE: Infrared spectrometric gas sensor

INVENTOR(S): Peters, Ralf-Peter; Rogner, Arnd; Uenal, Nezih; Heinrich, Lothar; Landwehr, Dierk; Auf der Heyde, Wolfgang

PATENT ASSIGNEE(S): Microparts Gesellschaft fuer Mikrostrukturtechnik MbH, Germany

SOURCE: Eur. Pat. Appl., 7 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: German

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
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| EP 704691 | A2 | 19960403 | EP 1994-120793 | 19941228 |
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| EP 704691 | A3 | 19970319 | | |
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| DE 4434814 | A1 | 19960404 | DE 1994-4434814 | 19940929 |
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| US 5550375 | A | 19960827 | US 1995-368634 | 19950104 |
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| JP 08114501 | A2 | 19960507 | JP 1995-246493 | 19950925 |
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PRIORITY APPLN. INFO.: DE 1994-4434814 19940929

AB Gases can be selectively (quant.) detd. by their gas-specific absorption in the IR spectral range. Known app. produce, to be sure, correct and precise results but are nevertheless commonly expensive, of considerable size, and place heavy demands on operation and maintenance. For the continuous monitoring of a gas stream or bulk gas, a spectrometric sensor is presented, which consists of a cast workpiece made in one piece (e.g. of plastic or metal) serving as the microstructure. The space between the mirror frames and the inlet and outlet gaps for the IR radiation contain the gas to be detd. quant. It is also suitable for serving as a transportable app. It can be mass-produced in large quantities and is usable in metal models even at high temps. With the new sensor one can improve, in an economical way, the safety of installations in which combustible, poisonous or other gases are contained or can appear (e.g. hydrocarbons, nitrogen oxides, water vapor and ammonia in a gas mixt.).